SOFTWARE VERIFICATION, VALIDATION AND TESTING

TESTING DOCUMENTATION

W3Schools SVVT Project

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1. Introduction

1.1. About the Project

The project will be about testing the reliabilities of certain aspects of the w3schools website, including the numerous courses, purchases, exercises and more.

https://www.w3schools.com/

1.2. Project Functionalities and Screenshots

The main features of this project are tests regarding the efficacy of the website and a few tests regarding the design aspect.

2. Test Plan

2.1. Scope

The plan is to test in a similar fashion to what an average user of the site would do, if they would like to start learning from the exercises then slowly move into the courses and certificates. After that, an average user would likely try a few quizzes and attempt to login and finally play around with the interesting features of the site.

2.2. Testing Environment and Tools

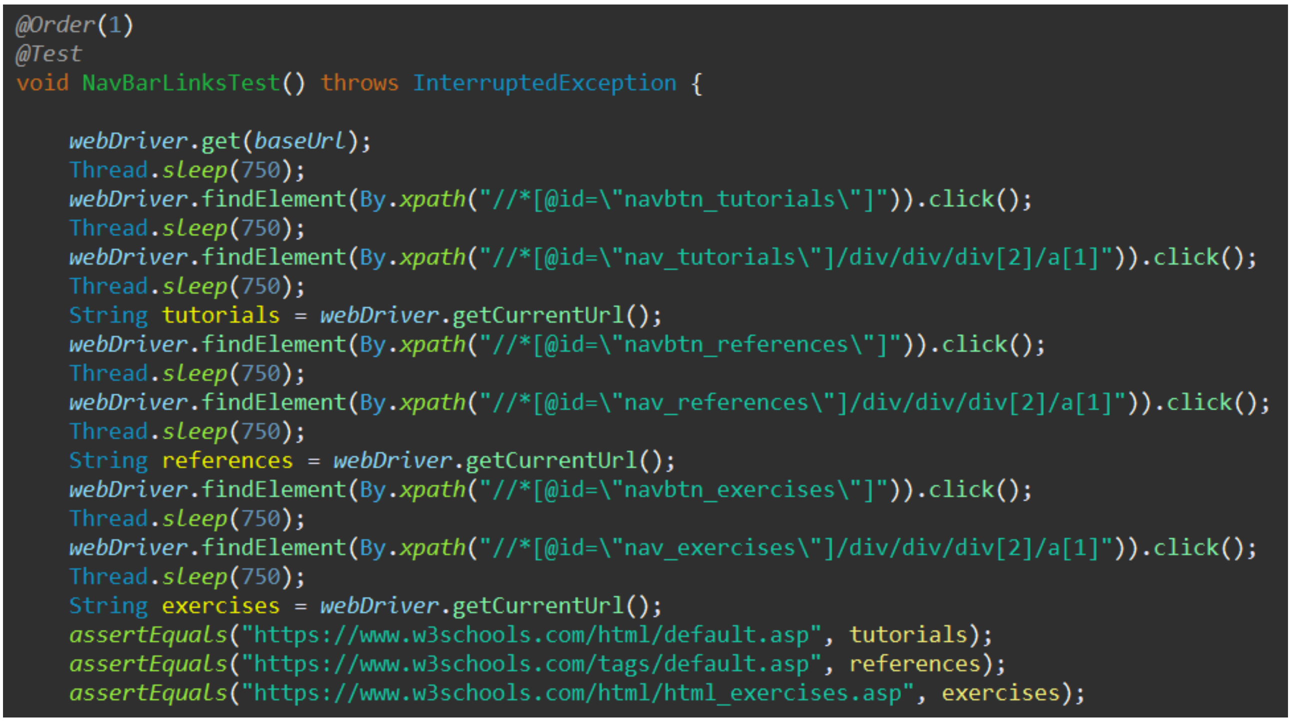
The testing will be done using the Selenium framework and the Java programming language.

3. Test Execution

3.1. Navigation Bar Links Scenario

The first test is a rather simple one and starts off with the curious link clicking that a new user might attempt to do once he first opens the site.

Test Name: Navbar links test				
Description: A test to determine whether the navigation links are working as intended				
Pre-condition(s):				
Test Steps: 1. Site homepage 2. Select navigation tutorials 3. Get the current URL 4. Select navigation references 5. Get the current URL 6. Select navigation exercises 7. Get the current URL 8. Compare the URLs with the manually entered URL’s	**Test Data:**	**Expected Result:** The user is taken to the desired sites by clicking on the links.	**Actual Result:** The user is taken to the desired sites by clicking on the links.	**Status:** PASS
Notes:				

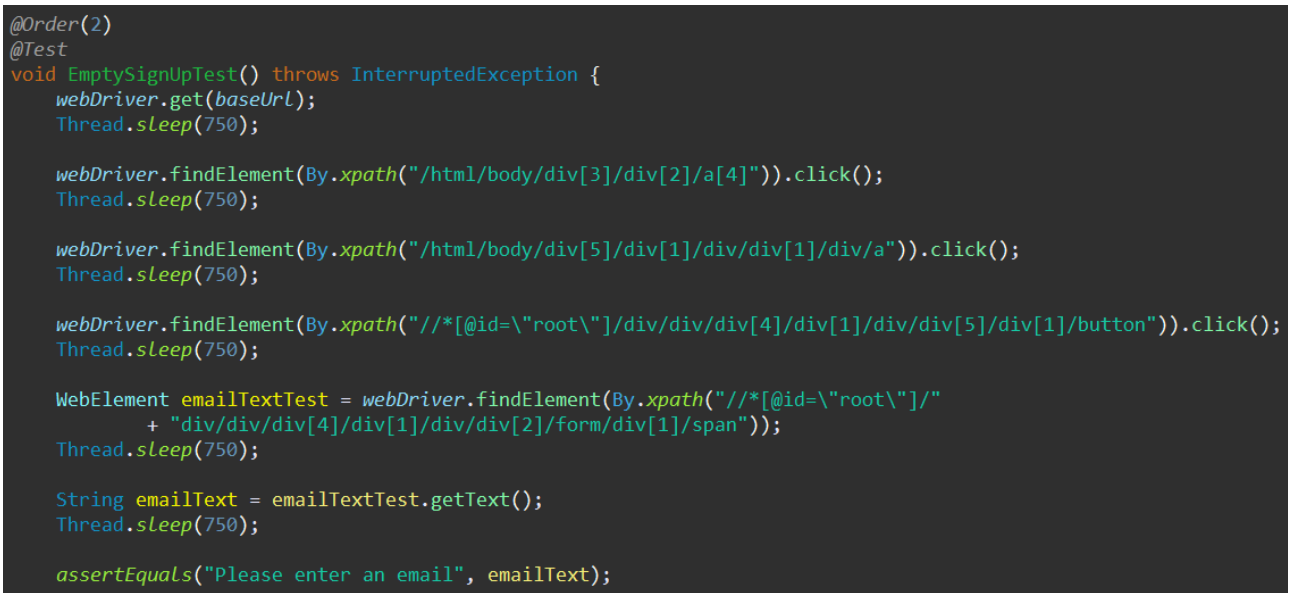


```
@Order(1)
@Test
void NavBarLinksTest() throws InterruptedException {

    webDriver.get(baseUrl);
    Thread.sleep(750);
    webDriver.findElement(By.xpath("//*[@id=\"navbtn_tutorials\"]")).click();
    Thread.sleep(750);
    webDriver.findElement(By.xpath("//*[@id=\"nav_tutorials\"]/div/div/div[2]/a[1]")).click();
    Thread.sleep(750);
    String tutorials = webDriver.getCurrentUrl();
    webDriver.findElement(By.xpath("//*[@id=\"navbtn_references\"]")).click();
    Thread.sleep(750);
    webDriver.findElement(By.xpath("//*[@id=\"nav_references\"]/div/div/div[2]/a[1]")).click();
    Thread.sleep(750);
    String references = webDriver.getCurrentUrl();
    webDriver.findElement(By.xpath("//*[@id=\"navbtn_exercises\"]")).click();
    Thread.sleep(750);
    webDriver.findElement(By.xpath("//*[@id=\"nav_exercises\"]/div/div/div[2]/a[1]")).click();
    Thread.sleep(750);
    String exercises = webDriver.getCurrentUrl();
    assertEquals("https://www.w3schools.com/html/default.asp", tutorials);
    assertEquals("https://www.w3schools.com/tags/default.asp", references);
    assertEquals("https://www.w3schools.com/html/html_exercises.asp", exercises);
```

3.2. Empty Signup Scenario

A user will often hit the sign in button without entering information, this is to test whether the appropriate action is taken in such a situation.

<table>
<tr><td colspan="5"><b>Test Name: Signup Test</b></td></tr>
<tr><td colspan="5"><b>Description:</b> The test works by, without inputting any data into the email, clicking on the sign up button to analyze the response.</td></tr>
<tr><td colspan="5"><b>Pre-condition(s):</b></td></tr>
<tr><td><b>Test Steps:</b>
1. Site homepage
2. Select sign up from navbar
3. Click the signup button with no input.
4. Get the text response
5. Compare the responses</td><td><b>Test Data:</b></td><td><b>Expected Result:</b>
User clicks on the signup button and is reminded with a message: “Please enter an email”.</td><td><b>Actual Result:</b>
User clicks on the signup button and is reminded with a message: “Please enter an email”.</td><td><b>Status:</b>
PASS</td></tr>
<tr><td colspan="5"><b>Notes:</b></td></tr>
</table>

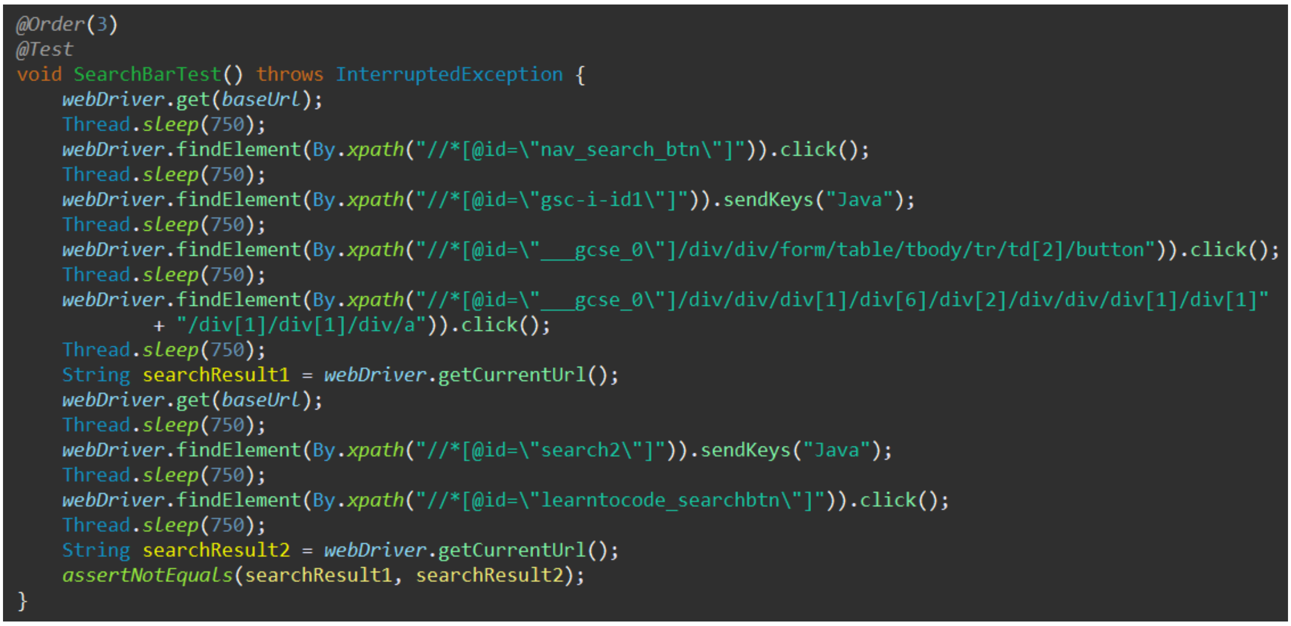


```java
@Order(2)
@Test
void EmptySignUpTest() throws InterruptedException {
    webDriver.get(baseUrl);
    Thread.sleep(750);

    webDriver.findElement(By.xpath("/html/body/div[3]/div[2]/a[4]")).click();
    Thread.sleep(750);

    webDriver.findElement(By.xpath("/html/body/div[5]/div[1]/div/div[1]/div/a")).click();
    Thread.sleep(750);

    webDriver.findElement(By.xpath("//*[@id=\"root\"]/div/div/div[4]/div[1]/div/div[5]/div[1]/button")).click();
    Thread.sleep(750);

    WebElement emailTextTest = webDriver.findElement(By.xpath("//*[@id=\"root\"]/"
            + "div/div/div[4]/div[1]/div/div[2]/form/div[1]/span"));
    Thread.sleep(750);

    String emailText = emailTextTest.getText();
    Thread.sleep(750);

    assertEquals("Please enter an email", emailText);
```

3.3. Search bars Scenario

Users want to be able to visit the home page and get a quick glance at the most important features it has to offer.

Test Name: Test search bars				
Description: Check if the home page search bar and the navigation search bar yield the same results.				
Pre-condition(s):				
Test Steps: 1. Go to the home page 2. Select the navigation search bar 3. Send keys “Java” 4. Click on the search button and check the first search result 5. Store the current URL 6. Navigate back to home page 7. Select the home page search bar 8. Send keys “Java” 9. Click on the search button 10. Store the current URL 11. Compare the two	**Test Data:**	**Expected Result:** The user is taken to the java course page using either method.	**Actual Result:** Using method 1, the user is taken to the Java course page, meanwhile using method 2, the user is taken to the JavaScript page.	**Status:** FAIL
Notes:				

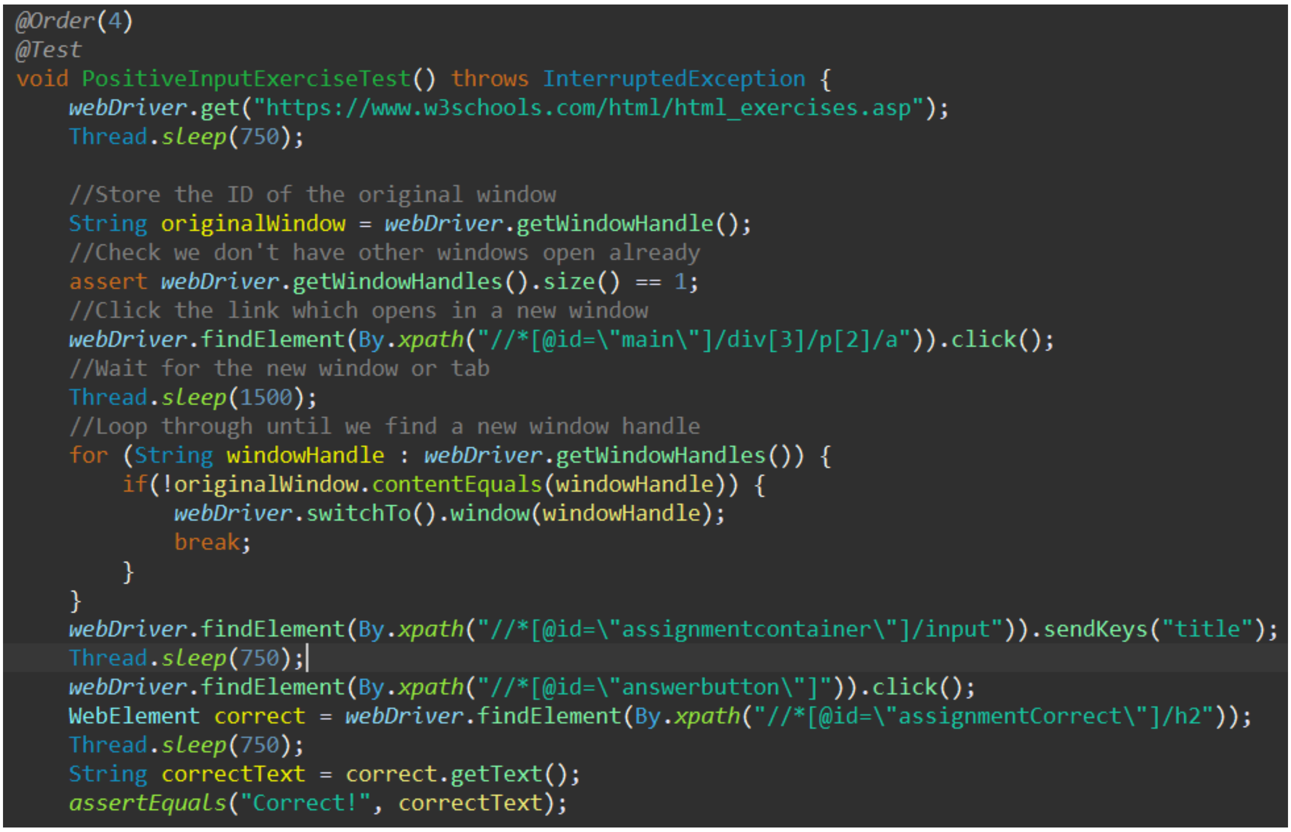


```java
@Order(3)
@Test
void SearchBarTest() throws InterruptedException {
    webDriver.get(baseUrl);
    Thread.sleep(750);
    webDriver.findElement(By.xpath("//*[@id=\"nav_search_btn\"]")).click();
    Thread.sleep(750);
    webDriver.findElement(By.xpath("//*[@id=\"gsc-i-id1\"]")).sendKeys("Java");
    Thread.sleep(750);
    webDriver.findElement(By.xpath("//*[@id=\"___gcse_0\"]/div/div/form/table/tbody/tr/td[2]/button")).click();
    Thread.sleep(750);
    webDriver.findElement(By.xpath("//*[@id=\"___gcse_0\"]/div/div/div[1]/div[6]/div[2]/div/div/div[1]/div[1]"
            + "/div[1]/div[1]/div/a")).click();
    Thread.sleep(750);
    String searchResult1 = webDriver.getCurrentUrl();
    webDriver.get(baseUrl);
    Thread.sleep(750);
    webDriver.findElement(By.xpath("//*[@id=\"search2\"]")).sendKeys("Java");
    Thread.sleep(750);
    webDriver.findElement(By.xpath("//*[@id=\"learntocode_searchbtn\"]")).click();
    Thread.sleep(750);
    String searchResult2 = webDriver.getCurrentUrl();
    assertNotEquals(searchResult1, searchResult2);
}
```

3.4. Input Exercise Scenario

This scenario will consist of two tests, a negative and a positive. The negative tests assert what happens in the case that the wrong input is introduced. The positive test asserts what happens if the correct input is introduced.

Test Name: Positive input exercise				
Description: Input of the correct result into the exercise				
Pre-condition(s):				
Test Steps: 1. Exercise page 2. Click the link and select the new window 3. Enter the proper input into the exercise 4. Click submit answer 5. Assert the correct answer	**Test Data:**	**Expected Result:** From the exercise page the user selects an exercise to complete. A new tab is opened and a question is presented. The user inputs the correct answer and is greeted with a “Correct!” message.	**Actual Result:** From the exercise page the user selects an exercise to complete. A new tab is opened and a question is presented. The user inputs the correct answer and is greeted with a “Correct!” message.	**Status:** PASS
Notes:				



```java
@Order(4)
@Test
void PositiveInputExerciseTest() throws InterruptedException {
    webDriver.get("https://www.w3schools.com/html/html_exercises.asp");
    Thread.sleep(750);

    //Store the ID of the original window
    String originalWindow = webDriver.getWindowHandle();
    //Check we don't have other windows open already
    assert webDriver.getWindowHandles().size() == 1;
    //Click the link which opens in a new window
    webDriver.findElement(By.xpath("//*[@id=\"main\"]/div[3]/p[2]/a")).click();
    //Wait for the new window or tab
    Thread.sleep(1500);
    //Loop through until we find a new window handle
    for (String windowHandle : webDriver.getWindowHandles()) {
        if(!originalWindow.contentEquals(windowHandle)) {
            webDriver.switchTo().window(windowHandle);
            break;
        }
    }
    webDriver.findElement(By.xpath("//*[@id=\"assignmentcontainer\"]/input")).sendKeys("title");
    Thread.sleep(750);
    webDriver.findElement(By.xpath("//*[@id=\"answerbutton\"]")).click();
    WebElement correct = webDriver.findElement(By.xpath("//*[@id=\"assignmentCorrect\"]/h2"));
    Thread.sleep(750);
    String correctText = correct.getText();
    assertEquals("Correct!", correctText);
```

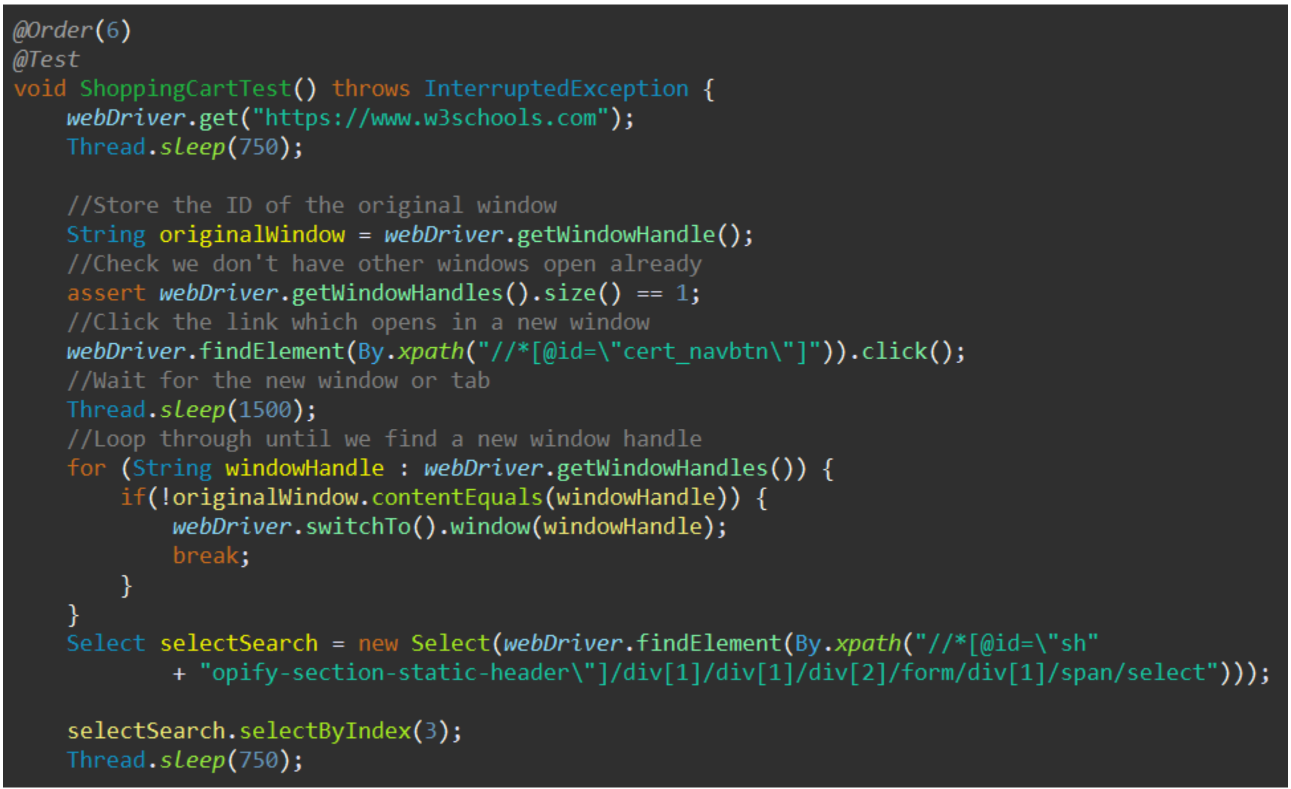
Test Name: Negative input exercise

Description: Input of the incorrect result into the exercise				
Pre-condition(s):				
Test Steps: 1. Exercise page 2. Click the link and select the new window 3. Enter the proper input into the exercise 4. Click submit answer 5. Assert the incorrect answer	**Test Data:**	**Expected Result:** From the exercise page the user selects an exercise to complete. A new tab is opened and a question is presented. The user inputs the incorrect answer and is greeted with a "Not correct" message.	**Actual Result:** From the exercise page the user selects an exercise to complete. A new tab is opened and a question is presented. The user inputs the incorrect answer and is greeted with a "Not correct" message.	**Status:** PASS
Notes: Are there any notes about this test you would like to add? If not, leave this blank.				

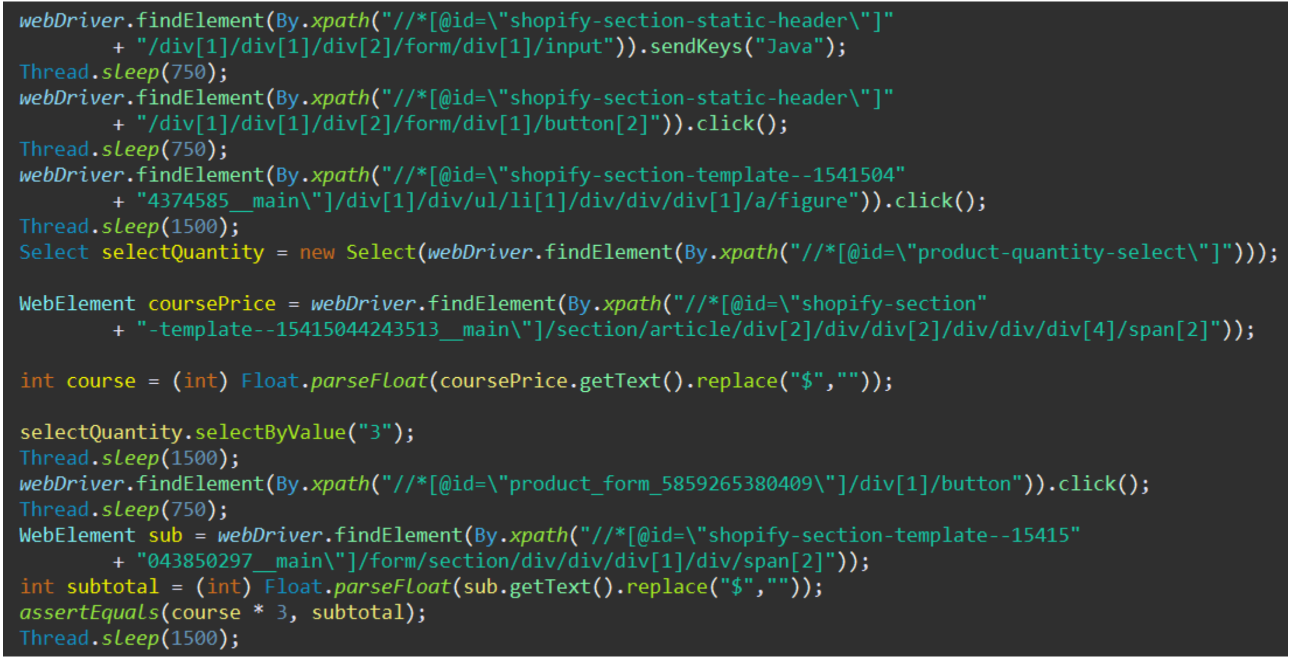
3.5. Shopping cart Scenario

This scenario generally happens when the user would like to see what is in the store or even purchase something from the site.

Test Name: Shopping cart test				
Description: A test to determine whether all factors of the purchase system are in order.				
Pre-condition(s):				
Test Steps: 1. Site homepage 2. Select link and open new tab 3. Select courses on the search bar 4. Input java into the search bar 5. Click on the first result 6. Get the price of the product. 7. Select 3 products and proceed to the shopping cart 8. Compare the product price with the subtotal	**Test Data:**	**Expected Result:** A user opens the store page, selects the courses option from the search bar and enters "Java". Then proceeds to buy 3 java courses and continue to the shopping cart for the final transaction.	**Actual Result:** A user opens the store page, selects the courses option from the search bar and enters "Java". Then proceeds to buy 3 java courses and continue to the shopping cart for the final transaction.	**Status:** PASS
Notes:				



```java
@Order(6)
@Test
void ShoppingCartTest() throws InterruptedException {
    webDriver.get("https://www.w3schools.com");
    Thread.sleep(750);

    //Store the ID of the original window
    String originalWindow = webDriver.getWindowHandle();
    //Check we don't have other windows open already
    assert webDriver.getWindowHandles().size() == 1;
    //Click the link which opens in a new window
    webDriver.findElement(By.xpath("//*[@id=\"cert_navbtn\"]")).click();
    //Wait for the new window or tab
    Thread.sleep(1500);
    //Loop through until we find a new window handle
    for (String windowHandle : webDriver.getWindowHandles()) {
        if(!originalWindow.contentEquals(windowHandle)) {
            webDriver.switchTo().window(windowHandle);
            break;
        }
    }
    Select selectSearch = new Select(webDriver.findElement(By.xpath("//*[@id=\"sh"
            + "opify-section-static-header\"]/div[1]/div[1]/div[2]/form/div[1]/span/select")));

    selectSearch.selectByIndex(3);
    Thread.sleep(750);
```

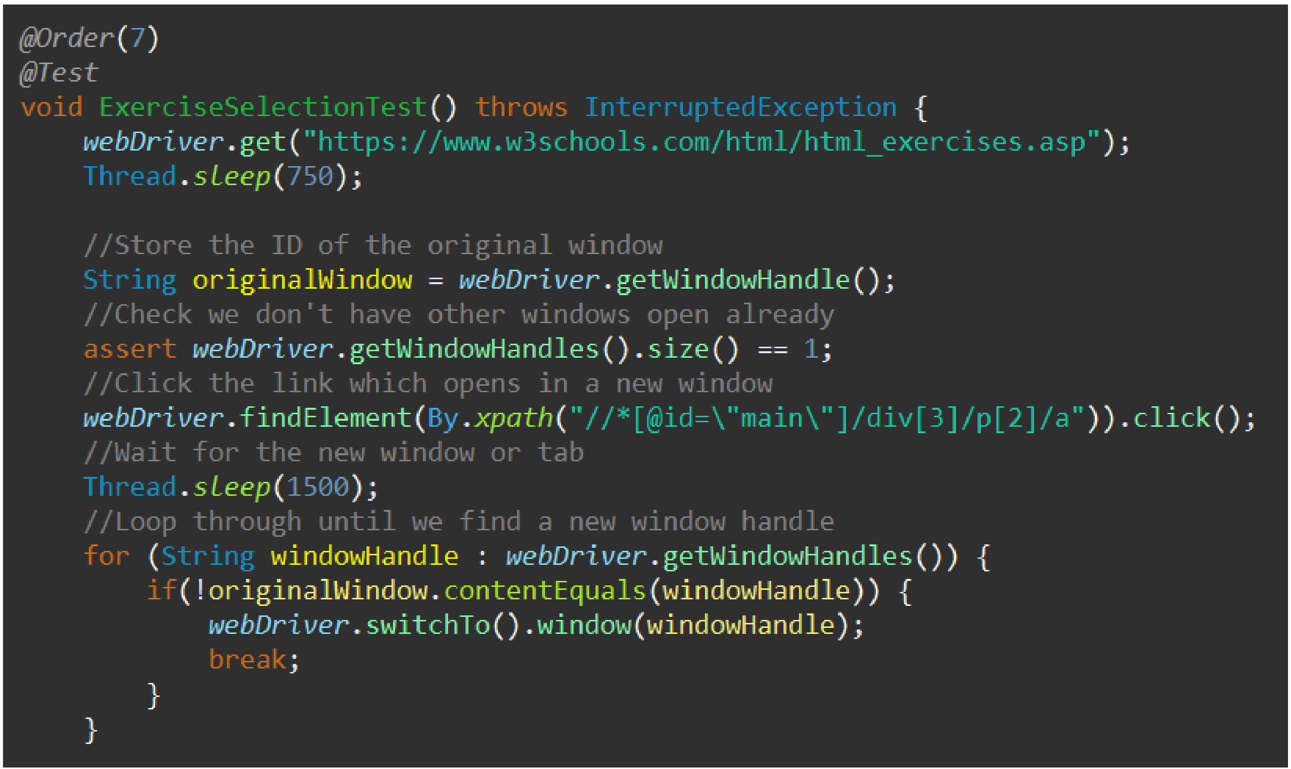


```java
webDriver.findElement(By.xpath("//*[@id=\"shopify-section-static-header\"]"
        + "/div[1]/div[1]/div[2]/form/div[1]/input")).sendKeys("Java");
Thread.sleep(750);
webDriver.findElement(By.xpath("//*[@id=\"shopify-section-static-header\"]"
        + "/div[1]/div[1]/div[2]/form/div[1]/button[2]")).click();
Thread.sleep(750);
webDriver.findElement(By.xpath("//*[@id=\"shopify-section-template--1541504"
        + "4374585__main\"]/div[1]/div/ul/li[1]/div/div/div[1]/a/figure")).click();
Thread.sleep(1500);
Select selectQuantity = new Select(webDriver.findElement(By.xpath("//*[@id=\"product-quantity-select\"]")));

WebElement coursePrice = webDriver.findElement(By.xpath("//*[@id=\"shopify-section"
        + "-template--15415044243513__main\"]/section/article/div[2]/div/div[2]/div/div/div[4]/span[2]"));

int course = (int) Float.parseFloat(coursePrice.getText().replace("$",""));

selectQuantity.selectByValue("3");
Thread.sleep(1500);
webDriver.findElement(By.xpath("//*[@id=\"product_form_5859265380409\"]/div[1]/button")).click();
Thread.sleep(750);
WebElement sub = webDriver.findElement(By.xpath("//*[@id=\"shopify-section-template--15415"
        + "043850297__main\"]/form/section/div/div/div[1]/div/span[2]"));
int subtotal = (int) Float.parseFloat(sub.getText().replace("$",""));
assertEquals(course * 3, subtotal);
Thread.sleep(1500);
```

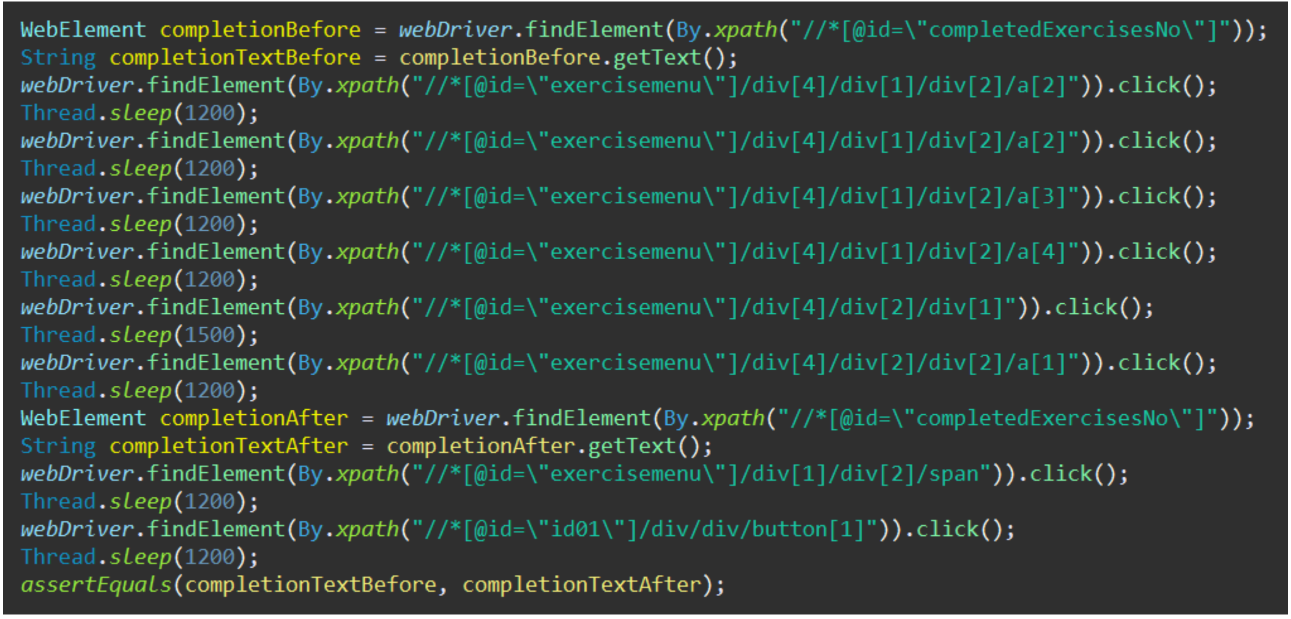
3.6. Exercise Selection Scenario

This is a scenario which focuses on the aspect of the website when a user takes an exercise and decides to skip over certain parts.

Test Name: Exercise selection test				
Description: The test selects exercises multiple times and skips over them to see whether the result is the same				
Pre-condition(s):				
Test Steps:	**Test Data:**	**Expected Result:**	**Actual Result:**	**Status:**
1. Exercise page 2. Open link and select new tab 3. Click on exercise 1.1 to 1.4 4. Click on exercise 2.1 5. Get current completed exercises 6. Assert it as 0		User opens an exercise, skips over it without submitting an answer.	User opens an exercise, skips over it without submitting an answer.	PASS
Notes:				



```java
@Order(7)
@Test
void ExerciseSelectionTest() throws InterruptedException {
    webDriver.get("https://www.w3schools.com/html/html_exercises.asp");
    Thread.sleep(750);

    //Store the ID of the original window
    String originalWindow = webDriver.getWindowHandle();
    //Check we don't have other windows open already
    assert webDriver.getWindowHandles().size() == 1;
    //Click the link which opens in a new window
    webDriver.findElement(By.xpath("//*[@id=\"main\"]/div[3]/p[2]/a")).click();
    //Wait for the new window or tab
    Thread.sleep(1500);
    //Loop through until we find a new window handle
    for (String windowHandle : webDriver.getWindowHandles()) {
        if(!originalWindow.contentEquals(windowHandle)) {
            webDriver.switchTo().window(windowHandle);
            break;
        }
    }
```

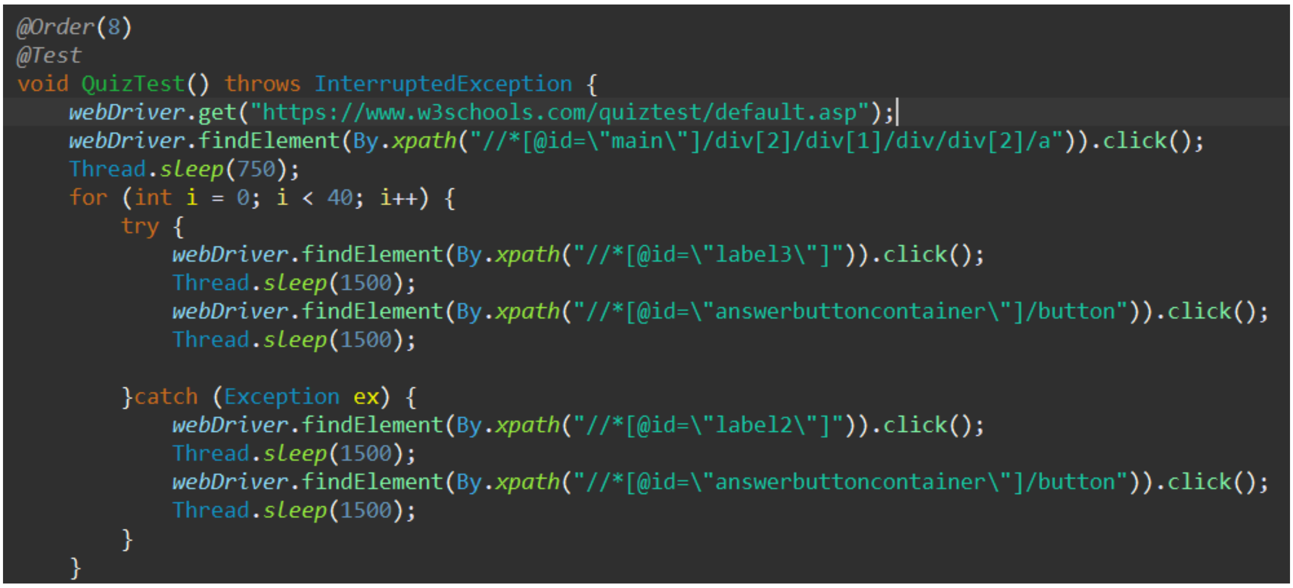


```java
WebElement completionBefore = webDriver.findElement(By.xpath("//*[@id=\"completedExercisesNo\"]"));
String completionTextBefore = completionBefore.getText();
webDriver.findElement(By.xpath("//*[@id=\"exercisemenu\"]/div[4]/div[1]/div[2]/a[2]")).click();
Thread.sleep(1200);
webDriver.findElement(By.xpath("//*[@id=\"exercisemenu\"]/div[4]/div[1]/div[2]/a[2]")).click();
Thread.sleep(1200);
webDriver.findElement(By.xpath("//*[@id=\"exercisemenu\"]/div[4]/div[1]/div[2]/a[3]")).click();
Thread.sleep(1200);
webDriver.findElement(By.xpath("//*[@id=\"exercisemenu\"]/div[4]/div[1]/div[2]/a[4]")).click();
Thread.sleep(1200);
webDriver.findElement(By.xpath("//*[@id=\"exercisemenu\"]/div[4]/div[2]/div[1]")).click();
Thread.sleep(1500);
webDriver.findElement(By.xpath("//*[@id=\"exercisemenu\"]/div[4]/div[2]/div[2]/a[1]")).click();
Thread.sleep(1200);
WebElement completionAfter = webDriver.findElement(By.xpath("//*[@id=\"completedExercisesNo\"]"));
String completionTextAfter = completionAfter.getText();
webDriver.findElement(By.xpath("//*[@id=\"exercisemenu\"]/div[1]/div[2]/span")).click();
Thread.sleep(1200);
webDriver.findElement(By.xpath("//*[@id=\"id01\"]/div/div/button[1]")).click();
Thread.sleep(1200);
assertEquals(completionTextBefore, completionTextAfter);
```

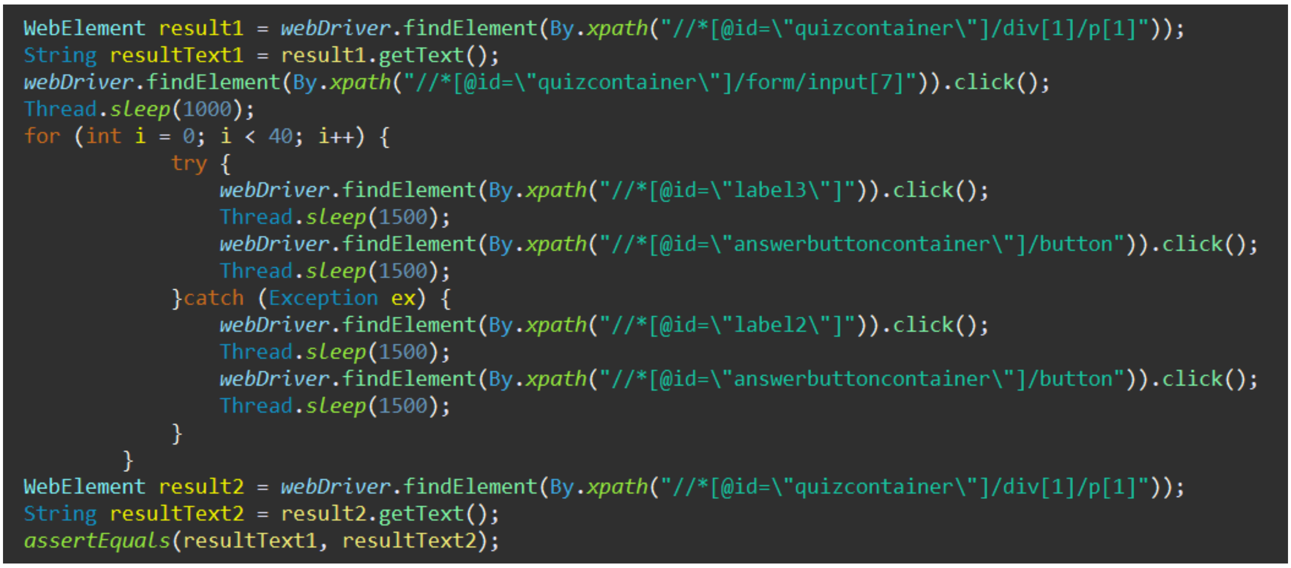
3.7. Quiz Selection Scenario

This is a longer scenario which focuses on the aspect of the website when a user takes a quiz.

<table>
<tr><td colspan="5"><b>Test Name:</b> Quiz selection test</td></tr>
<tr><td colspan="5"><b>Description:</b> The test selects answers multiple times and compares it to see whether the result is the same</td></tr>
<tr><td colspan="5"><b>Pre-condition(s):</b></td></tr>
<tr><td><b>Test Steps:</b>
1. Quiz page
2. Open link and select new tab
3. Start quiz
4. First loop trough the answers
5. Get results
6. Second loop trough the answers
7. Get results
8. Compare the two results</td><td><b>Test Data:</b></td><td><b>Expected Result:</b>
The user goes to a quiz page and finishes one, tries it again with the same answers and gets the same result.</td><td><b>Actual Result:</b>
The user goes to a quiz page and finishes one, tries it again with the same answers and gets the same result.</td><td><b>Status:</b>
PASS</td></tr>
<tr><td colspan="5"><b>Notes:</b></td></tr>
</table>



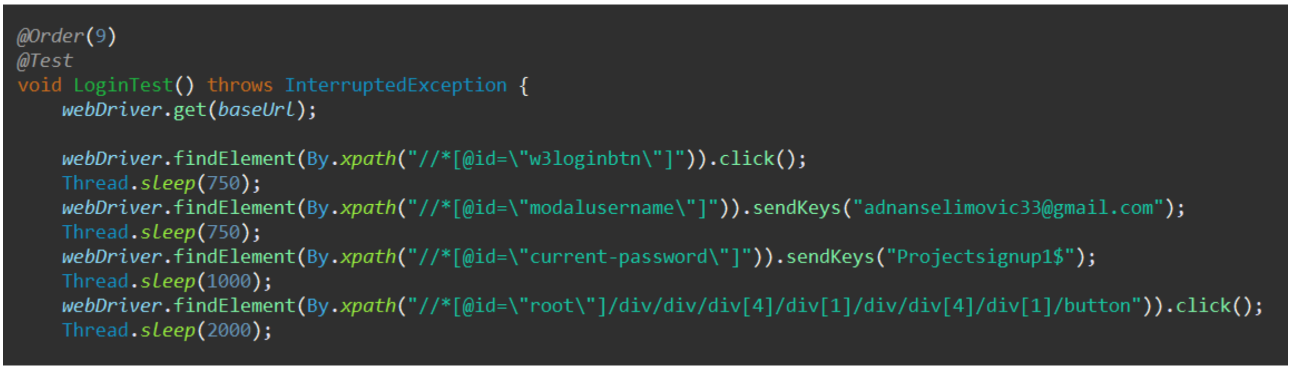
```java
@Order(8)
@Test
void QuizTest() throws InterruptedException {
    webDriver.get("https://www.w3schools.com/quiztest/default.asp");
    webDriver.findElement(By.xpath("//*[@id=\"main\"]/div[2]/div[1]/div/div[2]/a")).click();
    Thread.sleep(750);
    for (int i = 0; i < 40; i++) {
        try {
            webDriver.findElement(By.xpath("//*[@id=\"label3\"]")).click();
            Thread.sleep(1500);
            webDriver.findElement(By.xpath("//*[@id=\"answerbuttoncontainer\"]/button")).click();
            Thread.sleep(1500);

        }catch (Exception ex) {
            webDriver.findElement(By.xpath("//*[@id=\"label2\"]")).click();
            Thread.sleep(1500);
            webDriver.findElement(By.xpath("//*[@id=\"answerbuttoncontainer\"]/button")).click();
            Thread.sleep(1500);
        }
    }
```



```
WebElement result1 = webDriver.findElement(By.xpath("//*[@id=\"quizcontainer\"]/div[1]/p[1]"));
String resultText1 = result1.getText();
webDriver.findElement(By.xpath("//*[@id=\"quizcontainer\"]/form/input[7]")).click();
Thread.sleep(1000);
for (int i = 0; i < 40; i++) {
            try {
                webDriver.findElement(By.xpath("//*[@id=\"label3\"]")).click();
                Thread.sleep(1500);
                webDriver.findElement(By.xpath("//*[@id=\"answerbuttoncontainer\"]/button")).click();
                Thread.sleep(1500);
            }catch (Exception ex) {
                webDriver.findElement(By.xpath("//*[@id=\"label2\"]")).click();
                Thread.sleep(1500);
                webDriver.findElement(By.xpath("//*[@id=\"answerbuttoncontainer\"]/button")).click();
                Thread.sleep(1500);
            }
        }
WebElement result2 = webDriver.findElement(By.xpath("//*[@id=\"quizcontainer\"]/div[1]/p[1]"));
String resultText2 = result2.getText();
assertEquals(resultText1, resultText2);
```

3.8. Login Scenario

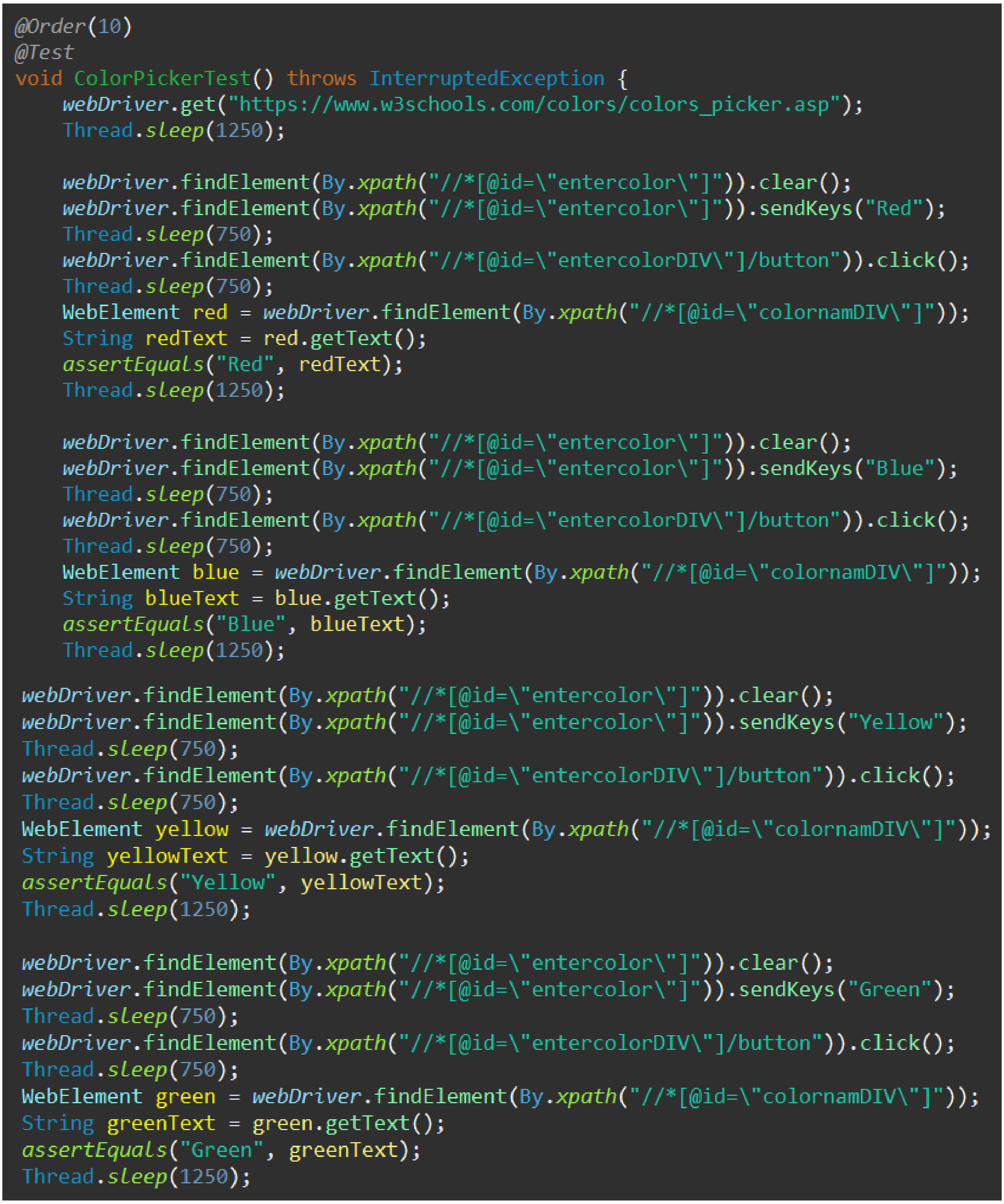
Test Name: Login test				
Description: A simple test to attempt to login into the site using credentials				
Pre-condition(s): Are there any conditions or other tests that need to be executed before this test; are there any test fixtures? If not, leave this blank.				
Test Steps: 1. Site homepage 2. Select login page 3. Enter email 4. Enter password. 5. Select login	**Test Data:**	**Expected Result:** User enters the credentials into the given fields and is accepted.	**Actual Result:** User enters credentials and the tab closes.	**Status:** FAIL
Notes:				



```
@Order(9)
@Test
void LoginTest() throws InterruptedException {
    webDriver.get(baseUrl);

    webDriver.findElement(By.xpath("//*[@id=\"w3loginbtn\"]")).click();
    Thread.sleep(750);
    webDriver.findElement(By.xpath("//*[@id=\"modalusername\"]")).sendKeys("adnanselimovic33@gmail.com");
    Thread.sleep(750);
    webDriver.findElement(By.xpath("//*[@id=\"current-password\"]")).sendKeys("Projectsignup1$");
    Thread.sleep(1000);
    webDriver.findElement(By.xpath("//*[@id=\"root\"]/div/div/div[4]/div[1]/div/div[4]/div[1]/button")).click();
    Thread.sleep(2000);
```

3.9. Color picker Scenario

Test Name: Color picker test				
Description: On the site there is a color picker which a user can input data into to get the desired color				
Pre-condition(s):				
Test Steps: 1. Color picker page 2. Enter “Red” into the field 3. Click the button 4. Get the resulting text 5. Enter “Blue” into the field 6. Click the button 7. Get the resulting text 8. Enter “Yellow” into the field 9. Click the button 10. Get the resulting text 11. Enter “Green” into the field 12. Click the button 13. Get the resulting text 14. Compare all of the expected results with the text	**Test Data:**	**Expected Result:** User inputs a certain color into the input and is greeted by a change in color.	**Actual Result:** User inputs a certain color into the input and is greeted by a change in color.	**Status:** PASS
Notes:				



```
@Order(10)
@Test
void ColorPickerTest() throws InterruptedException {
    webDriver.get("https://www.w3schools.com/colors/colors_picker.asp");
    Thread.sleep(1250);

    webDriver.findElement(By.xpath("//*[@id=\"entercolor\"]")).clear();
    webDriver.findElement(By.xpath("//*[@id=\"entercolor\"]")).sendKeys("Red");
    Thread.sleep(750);
    webDriver.findElement(By.xpath("//*[@id=\"entercolorDIV\"]/button")).click();
    Thread.sleep(750);
    WebElement red = webDriver.findElement(By.xpath("//*[@id=\"colornamDIV\"]"));
    String redText = red.getText();
    assertEquals("Red", redText);
    Thread.sleep(1250);

    webDriver.findElement(By.xpath("//*[@id=\"entercolor\"]")).clear();
    webDriver.findElement(By.xpath("//*[@id=\"entercolor\"]")).sendKeys("Blue");
    Thread.sleep(750);
    webDriver.findElement(By.xpath("//*[@id=\"entercolorDIV\"]/button")).click();
    Thread.sleep(750);
    WebElement blue = webDriver.findElement(By.xpath("//*[@id=\"colornamDIV\"]"));
    String blueText = blue.getText();
    assertEquals("Blue", blueText);
    Thread.sleep(1250);

webDriver.findElement(By.xpath("//*[@id=\"entercolor\"]")).clear();
webDriver.findElement(By.xpath("//*[@id=\"entercolor\"]")).sendKeys("Yellow");
Thread.sleep(750);
webDriver.findElement(By.xpath("//*[@id=\"entercolorDIV\"]/button")).click();
Thread.sleep(750);
WebElement yellow = webDriver.findElement(By.xpath("//*[@id=\"colornamDIV\"]"));
String yellowText = yellow.getText();
assertEquals("Yellow", yellowText);
Thread.sleep(1250);

webDriver.findElement(By.xpath("//*[@id=\"entercolor\"]")).clear();
webDriver.findElement(By.xpath("//*[@id=\"entercolor\"]")).sendKeys("Green");
Thread.sleep(750);
webDriver.findElement(By.xpath("//*[@id=\"entercolorDIV\"]/button")).click();
Thread.sleep(750);
WebElement green = webDriver.findElement(By.xpath("//*[@id=\"colornamDIV\"]"));
String greenText = green.getText();
assertEquals("Green", greenText);
Thread.sleep(1250);
```

9. Conclusion

9.1. Testing Summary

Testing Tool	Total Tests	Passed Tests	Failed Tests
Selenium	10	8	2

9.2. Final Thoughts

I believe the website was implemented extremely well and holds Its name as one of the most famous coding school type websites. The tests and scenarios were very interesting to implement.